REMARKS

Applicant requests favorable reconsideration and allowance of the subject application in view of the preceding amendments and the following remarks.

Claims 45-52 and 105-121 are presented for consideration. Claims 45 and 105 are independent. To expedite prosecution, claims 77-104 have been canceled without prejudice or disclaimer.

Applicant notes with appreciation that claims 45-52 have been allowed over the art record. In addition to these claims being allowable, Applicant submits that claims 105-121 patentably define features of the subject invention. Accordingly, Applicant requests favorable reconsideration and withdrawal of the rejections set forth in the above-noted Office Action.

Claims 105, 106, 108-114 and 117-120 were rejected under 35 U.S.C. § 102 as being anticipated by U.S. Patent No. 5,696,623 to Fujie et al. Claims 77-104, 107, 115, 116 and 121 were rejected under 35 U.S.C. § 103 as being unpatentable over the Fujie et al. patent in vewi of U.S. Patent No. 5,995,263 to Tokuda et al. Applicant submits that the cited art, whether taken individually or in combination, does not teach or suggest many features of the present invention as recited in independent claim 105. Therefore, these rejections are respectfully traversed.

Independent claim 105 recites an exposure apparatus that includes a projection optical system, having a plurality of optical elements, for projecting a pattern onto a predetermined plane, a barrel for accommodating the plurality of optical elements, gas supplying means disposed between the predetermined plane and a final optical element, which is one of the plurality of optical elements that is closest to the predetermined plane, the final optical element

being placed at a position of an opening formed in a portion of the barrel, which portion is closest to the predetermined plane, the gas supplying means supplying a gas from one side of the projection optical system, and gas exhaust means disposed at the other side, opposite to the one side, for exhausting the gas. The gas supplying means has a plurality of gas supply ports and the gas exhaust means has a plurality of gas exhausting ports.

The present invention recited in independent claim 105 seeks to overcome a problem with conventional arrangements. Specifically, a conventional problem is that a resist material or other impurities are raised from a substrate, such as a wafer, disposed at an image plane (or a projection plane) of an exposure apparatus. The thus raised resist material is then deposited onto the surface of a final optical element of the projection optical system.

The present invention recited in independent claim 105, therefore, aims to avoid or to reduce undesirable deposition of impurities such as a raised resist material, or the like, onto the surface of the final optical element. To this end, according to the present invention recited in independent claim 105, the gas supplying means has a plurality of gas supply ports and the gas exhaust means has a plurality of gas exhaust ports, provided between the projection plane (or the predetermined plane, as recited in independent claim 105), and the final optical element of the projection optical system. This arrangement is very effective in reducing a drift of gas flow, particularly, as compared to a structure in which only a gas supply port or ports are provided. Thus, with the present invention recited in independent claim 105, a gas flow can be created between the final optical element and the projection plane more stably, by which deposition of impurities in the surface of the final of the optical element can be avoided or reduced,

significantly and assuredly. Such features of the present invention are shown in, for example, Fig. 5B, of the subject application.

Applicant submits that the cited art, whether taken individually or in combination, does not teach or suggest such features of the present invention, as recited in independent claim 105.

The Fujie et al. patent shows an ultraviolet exposure apparatus in which substances contained in an atmosphere contacting a lens surface are reduced. Openings are formed in the wall of a lens barrel to allow the atmosphere to be replaced by a proper gas. The pure atmospheric gas may be a gas not containing oxygen, such as nitrogen gas, or clean air obtained by intentionally generating accumulations by applying ultraviolet light to source air. An ultraviolet light source is preferably cooled by a cooling system different from a cooling system of a lens optical system.

In the Fujie et al. patent, air is blown into a space between the lenses, as is shown in Figs. 1, 2 and 3 of that patent. Also, that patent, at column 5, lines 27-28, states that "air in the space S between lenses can thus be replaced by the desired atmospheric gas." Also, Fig. 6B of the Fujie et al. patent, shows that there is actually no gas supply port between the projection plane 16 and the optical element (pellicle 25) closest to the projection plane. In that patent, rather, the gas supply port is present above the pellicle 25, that is, in the space at the reticle side. In contrast, in the present invention recited in claim 105, the final optical element is the optical element closest to the projection plane (predetermined plane). Thus, Figs. 1-3 of the Fujie et al. patent clearly show that the lowermost lens corresponds to the final optical element, and, Fig. 6B shows that the pellicle at the lowermost position corresponds to this.

In short, in the exposure apparatus set forth in the Fujie et al. patent, there is no gas supply port provided between the projection plane and the optical element disposed at the opening of the projection optical system closest to the projection plane. Applicant submits, therefore, that the Fujie et al. patent does not teach or suggest the salient features of Applicant's present invention as recited in independent claim 105.

Applicant further submits that the remaining art cited does not cure the deficiencies noted above with respect to the Fujie et al. patent.

The Tokuda et al. patent shows a projection exposure apparatus in which an air conditioning device 49 for temperature adjustment is provided between a projection optical system 14A and a photosensitive substrate 17. This is shown in Figs. 8, 12 and 13, and discussed at column 16, lines 31-43, of the Tokuda et al. patent. Applicant submits, however, that the Tokuda et al. patent merely teaches a single air conditioning device. Accordingly, that patent teaches nothing regarding the use of a plurality of gas supply ports, as in the present invention recited in independent claim 105. In turn, it follows that the Tokuda et al. patent also does not teach or suggest the user of a plurality of gas exhaust ports, as in the present invention recited in independent claim 105. Applicant submits, therefore, that the Tokuda et al. patent adds nothing to the teachings of the Fujie et al. patent that would render obvious Applicant's present invention recited in independent claim 105.

Still further, Applicant submits that neither the Fujie et al. patent nor the Tokuda et al. patent teaches or suggests anything about the problem with conventional devices, which the present invention recited in independent claim 105 overcomes. Applicant submits, therefore, that

there is no incentive or motivation to combine the art in the manner suggested in the Office Action, absent Applicant's disclosure. Accordingly, that there would have been no reason for one having ordinary skill in the art to combine the art suggested in the Office Action. Still further, for the reasons discussed above, Applicant submits that even if the art were so combined, Applicant's present invention recited in independent claim 105 would not result.

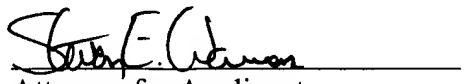
For the foregoing reasons, Applicant submits that the present invention, as recited in independent claim 105, also is patentably defined over the cited art.

Dependent claims 106-121 also should be deemed allowable, in their own right, for defining other patentable features of the present invention in addition to those recited in independent claim 105. Further individual consideration of these dependent claims is requested.

Applicant further submits that the instant application is in condition for allowance. Favorable reconsideration, withdrawal of the rejections set forth in the above-noted Office Action and an early Notice of Allowance are requested.

Applicant's undersigned attorney may be reached in our Washington, D.C. office by telephone at (202) 530-1010. All correspondence should be directed to our address listed below.

Respectfully submitted,



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